

BITE PROCEDURE FOR AN/WSC-3 SATCOM TRANSCEIVER SYSTEMS

BITE (Built-in Test Equipment)- Provides limited, continuous monitoring of Radio Set functions without interference to the operational signals. BITE tests permit rapid isolation of faults to the replaceable module level.

TEST SELECT	MODULE/FUNCTION TESTED	MODULATION SWITCH	COMM MODE SWITCH	NOTES
1	A2, Power Supply	N/A	N/A	N/A
2	A23, RF Oscillator	N/A	N/A	N/A
3	A23, RF Oscillator Oven	N/A	N/A	N/A
4	A8, Synthesizer	N/A	N/A	N/A
5	A22, VCXO Output	N/A	N/A	N/A
6	A22, VCXO Oven	N/A	N/A	N/A
7	A10, 70Mhz Modulator	N/A	N/A	N/A
8	A6, 70Mhz Translator	N/A	N/A	N/A
9	A5, PSK Logic Transmitter	PSK	N/A	1,8
10	A1, Transmitter	AM	N/A	2, 3, 8
11	Key Command	N/A	N/A	2
12	VSWR	N/A	N/A	2
13	A17, Blanker	N/A	N/A	N/A
14	A16, Main IF Amp	N/A	N/A	3
15	A15, AM Detector	AM	LOS	N/A
16	A14, FM Detector	FM	LOS	8, 9
17	A18, RX Front End	AM	LOS	8, 9
18	A13, Data IF	N/A	SATCOM	N/A
19	A12, AFC Sweep	FSK	SATCOM	4
20	A7, PSK Detector	PSK	SATCOM	1, 5, 6, 8
21	A3, PSK Logic Rcvr	PSK	SATCOM	1, 5, 6, 7, 8
22	A4, FSK Detector	FSK	SATCOM	5, 7, 8
23	A19, Data Buffer (Hi L)	FSK	SATCOM	5, 7, 8
24	A19, Data Buffer (Lo L)	FSK	SATCOM	5, 7, 8

NOTES:

1. Test at ALL PSK data rates.
2. Set and hold TEST switch and activate TEST KEY switch. CARRIER ON indicator lights.
3. BITE meter indicates 3 to 10 for normal operation.
4. BITE meter indication varies slowly from 0 to 6 minimum.
5. Allow 10 seconds, maximum for carrier lock-up time.
6. Repeat test if NO GO is obtained to ensure carrier lock-up time.
7. DATA SIG ACQ indicator lights.
8. Set A19A1S1 to INT for test.
9. Ensure Remote Key is not selected to prevent RF Transmission.

SATCOM BITE PROCEDURE (cont.)

BITE (Built-in Test Equipment)- (cont.)

If bite 1-6,8 fail: Trouble shoot the one that fails first.
If bite 10-12 fail: Trouble shoot the last one that fails.
If bite 13-17 fail: Trouble shoot the one that fails first.

There are three things that will turn on the malfunction light.

1. A power supply problem
2. A frequency problem
3. A bad bite module

If the malfunction light is:

ON in the standby mode and you do not have any other front panel lights then check the power supply.

ON in the standby mode and you do have other front panel lights then check the bite module.

OFF in standby mode and goes ON in the operate mode then run bites 1-4 and trouble shoot the first one that fails.

SATCOM BITE PROCEDURE (cont.)

NOTES:

SATCOM BITE PROCEDURE (cont.)

BITE 1 - 1A1A2-Voltage Regulator

The DC voltages monitored by the summing circuit consist of 7 output voltages from the voltage regulator and 2 input voltages from chassis mounted components.

The outputs are: +68 Vdc, +28 Vdc, -28 Vdc, +12 Vdc, -12Vdc, -12 Vdc External and +5 Vdc.

The input DC voltages are: -20 Vdc and +19.5 Vdc.

NOTE

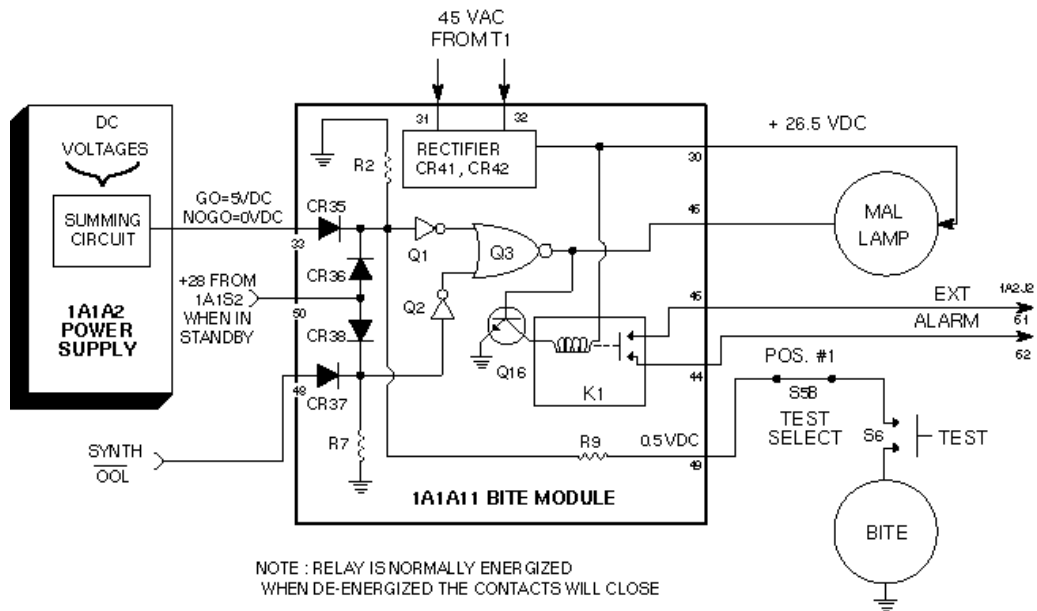
The bite does not check +225 Vdc, +12 Vdc, +7 vdc.

1. 1A1A11CR41 and CR42 receive 45 Vac from 1A1T1 and provide 26.5Vdc for use by circuits used in Bites #1 and #4. This voltage is used to drive the Malfunction Lamp DS5 and relay coil of K1.

2. When all of the summing voltages are present, the summing circuit will output a logic 1 (5 Vdc). If there is a problem with one of the summing voltages, the output will be a logic 0 (0 Vdc).

3. With a low from the summing circuit, the Bite meter (M2) will not show in the green (good). The low from the summing circuit is felt at Q1 and R9 which is a dropping resistor that drives the Bite Meter. Q1 will invert the low to a high. The high is felt on one of the inputs of NOR Gate Q3. Q3 will invert the signal back to a low that will drive the Malfunction Lamp DS5 and shut off Q16 which provides a path to ground for K1 when conducting. With a low on one side of the malfunction lamp and a high on the other the lamp will light. At the same time K1 will de-energize and close its contacts causing external alarms to go off if connected.

SATCOM BITE PROCEDURE (cont.)



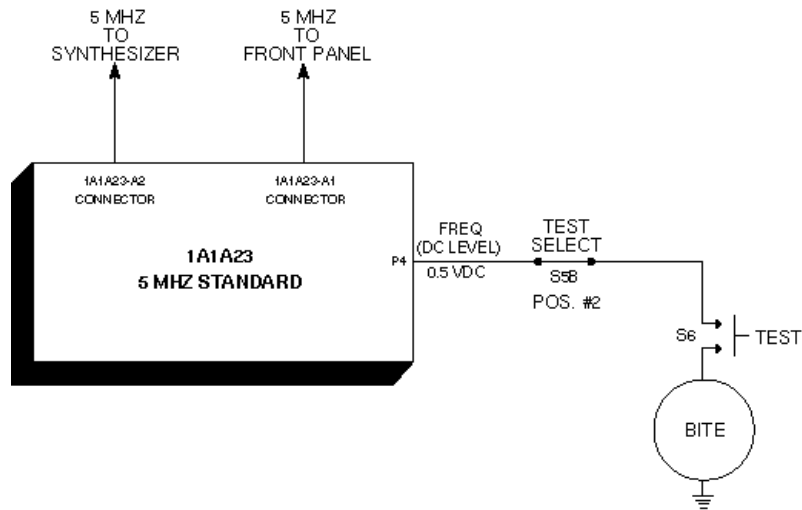
BITE #1 A2 POWER SUPPLY

Notes:

SATOM BITE PROCEDURE (cont.)

BITE 2 - 1A1A23 5 Mhz Oscillator

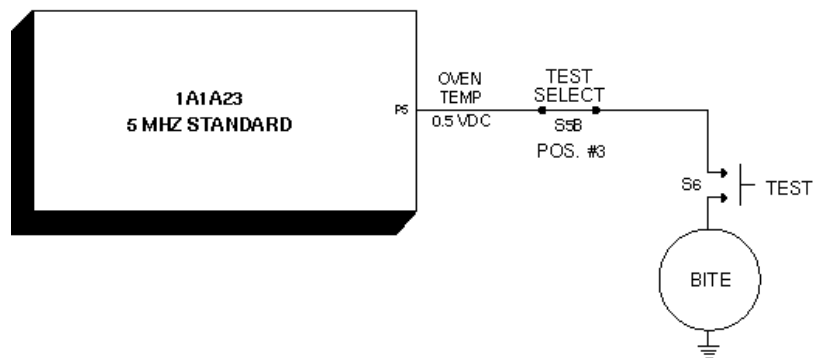
Provides a DC level to the BITE Meter that represents the RF level of the 1A1A23 5 Mhz oscillator. Bite checks the 5 Mhz to the synthesizer, and can be seen at 1A1A8-P1-A7. It does not check the 5Mhz that goes to the front panel.



BITE #2 A23 RF OSCILLATOR OUTPUT

BITE 3 - 1A1A23 5 Mhz Oven

Indicates that the 5 Mhz oven has heated the oscillator circuit to an acceptable level. A cold radio will fail on this BITE. It should pass the bite within 5 to 10 minutes after turn on.



BITE #3 A23 RF OSCILLATOR OVEN

SATCOM BITE PROCEDURE (cont.)

Notes:

SATCOM BITE PROCEDURE (cont.)

BITE 4 - 1A1A8 Synthesizer

1. 1A1A11CR41 and CR42 receive 45 Vac from 1A1T1 and provide 26.5Vdc for use by circuits used in Bite #1 and #4. This voltage is used to drive the Malfunction Lamp DS5 and relay coil of K1.

2. When a problem occurs in the synthesizer that generates an OOL NOT signal (logic low, 0 Vdc), the Transmitter is prevented from keying. This OOL NOT signal is also applied to the Bite module.

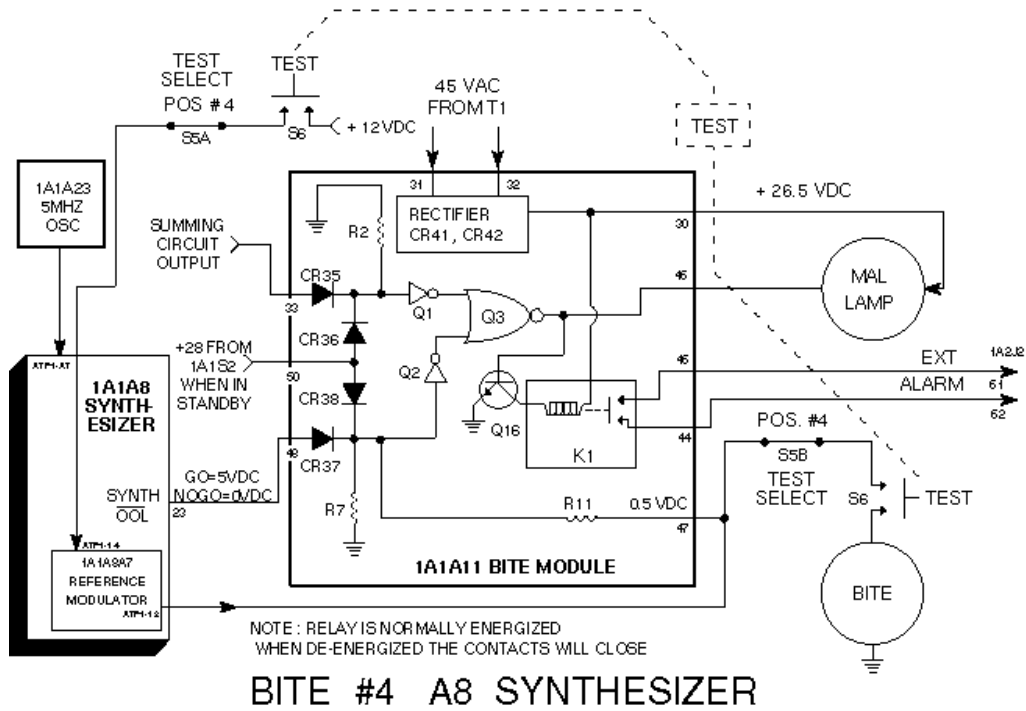
* Check that there is a valid frequency dialed up on the front panel manual thumbwheel switches or programmed in the Preset Channel module. Also check that the 1A1S20 Int/Ext switch is not in the EXT position if an External Frequency Standard is NOT being used. This will cause an OOL NOT signal to be generated and will light the malfunction lamp.

3. With a low from the Synthesizer via pin 1A1A11P1-48, the Bite meter (M2) will not show in the green (good). The low from the Synthesizer is felt at Q2 and R11 which is a dropping resistor that drives the Bite Meter. Q2 will invert the low to a high. The high is felt on one of the inputs of NOR Gate Q3. Q3 will invert the signal back to a low that will drive the Malfunction Lamp DS5 and shut off Q16 which provides a path to ground for K1 when conducting. With a low on one side of the malfunction lamp and a high on the other, the lamp will light. K1 is normally energized which breaks contacts making an open between pins 1A1A11P1-44 and 46. A low output from NOR Gate Q3 will cause Q16 to shut off and de-energize K1. This will close the contacts of K1 and enable an Ext. Alarm. If power is lost to the RT Unit, K1 will de-energize to complete the circuit for an Ext. alarm.

* To determine if the problem is in the bite module or the synthesizer, extend the bite module and with a multimeter check 1A1A11-P48. If there is 5Vdc the synthesizer is good and the fault lies in the bite module. If 0Vdc then the Synthesizer may need to be replaced. Before replacing the Synthesizer check the BCD Codes from the 1A1A9

4. With Test Switch 1A1S6 depressed, the Bite Meter will be placed in line with output pin 1A1A11P1-47 of the Bite Module via the Test Select Switch 1A1S5B. At the same time 1A1S5A will pass a +12 Vdc enable to the Reference Modulator 1A1A8A7 via P1-14. If there is a malfunction, then the Reference Modulator will generate a low at 1A1A8A7P1-12 that will prevent the Bite Meter from moving into the green.

SATCOM BITE PROCEDURE (cont.)

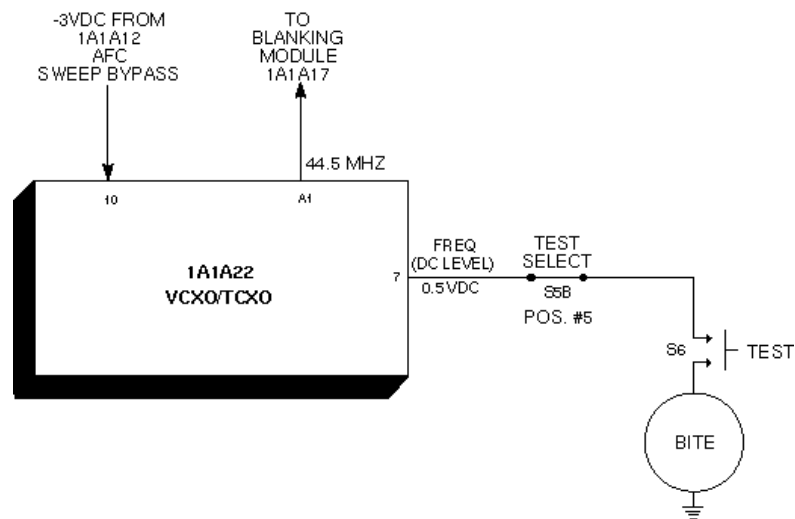


Notes:

SATCOM BITE PROCEDURE (cont.)

BITE 5 - VCXO or TCXO frequency level

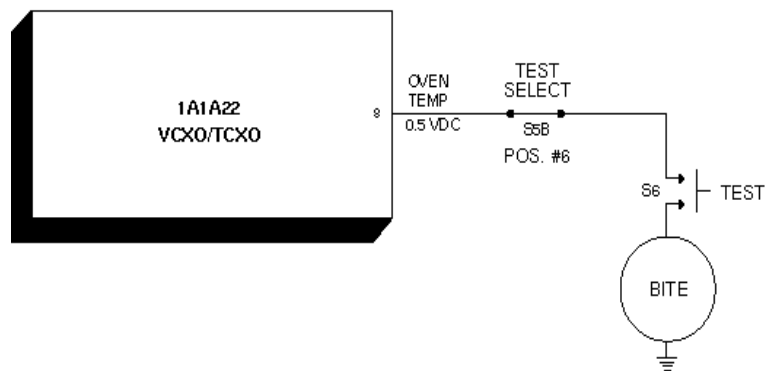
Converts RF level to a DC level to drive the bite meter. If bite fails check 1A1A12J4 for $-3V_{dc} \pm 150mv$, and then check 1A1A17P5 for 44.5 Mhz.



BITE #5 A22 VCXO/TCXO OUTPUT

BITE 6 - VCXO Oven

Indicates that oven circuit is working. A cold radio will cause this BITE to fail. It should be working within 5-10 minutes after turn on. If using a TCXO, Bite #6 will be wired to give a go regardless of temperature.

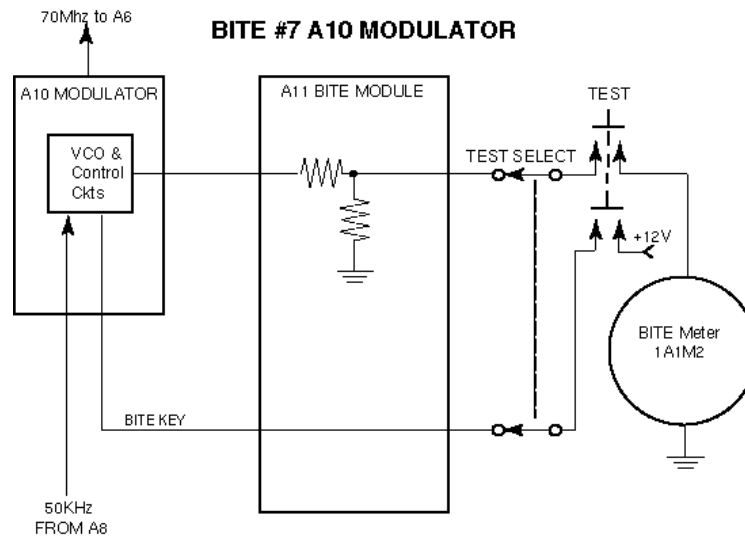


BITE #6 A22 VCXO/TCXO OVEN

SATCOM BITE PROCEDURE (cont.)

BITE 7 - 70Mhz Modulator

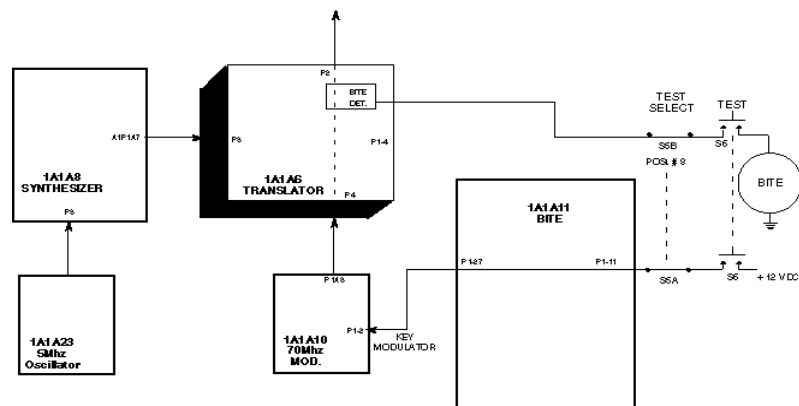
1. Conditions:
 - a. Test Select Switch 1A1S5 in position #7.
 - b. Test Switch 1A1S6 activated.
2. One half of 1A1S6 will connect +12 Vdc to the Bite module 1A1A11P1-11 and the 1A1A11P1-27 KEY MDOULATOR signal will then generate two outputs:
 - a. BITE KEY to the 70Mhz Modulator 1A1A10P1-2.
 - b. BITE KEY to the Translator 1A1A6P1-10.
3. Bite #7 compares the 50Khz reference from the 1A1A8 against the 50Khz RESET signal from the VCO ckt. If a difference is detected, then a low is generated at 1A1A10P1-9 to the Bite Module to eventually drive the meter.



SATCOM BITE PROCEDURE (cont.)

BITE 8 - A6 Translator

1. Conditions:
 - a. Test Select Switch 1A1S5 in position #8.
 - b. Test Switch 1A1S6 activated.
2. One half of 1A1S6 will connect the bite meter to internal AGC loop to monitor the level of the TX RF before the 1A1A1 Transmitter amplifies it.
3. Another function of the internal AGC loop and detector circuit is to disable the 1A1A1 Transmitter Module if the TX Freq is too low. This is done by driving TX ENABLE low.



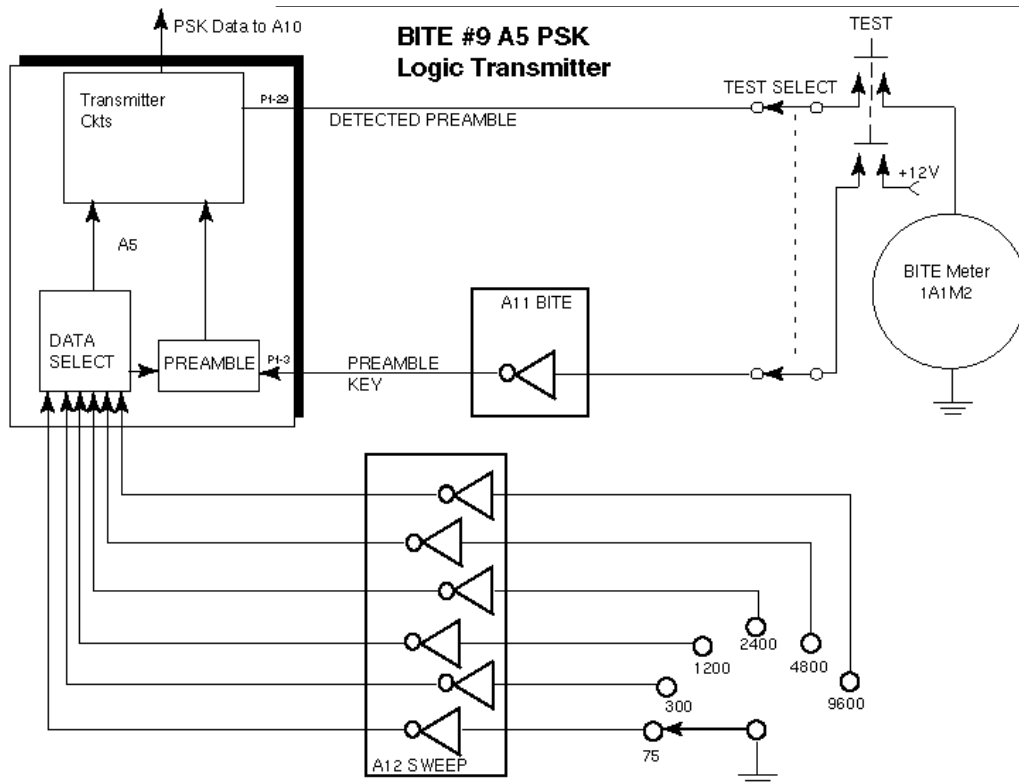
BITE # 8 70Mhz MODULATOR

Notes:

SATCOM BITE PROCEDURE (cont.)

BITE 9 - A5 PSK Logic Xmtr

1. Conditions:
 - a. Test Select Switch 1A1S5 in position #9.
 - b. Modulation Mode to PSK
 - c. Test Switch 1A1S6 activated.
2. One half of 1A1S6 will pass +12Vdc to the 1A1A11 Bite Module which inverts to a low. This low, BITE KEY Enable, generates preamble dependant on Data Rate selected.
3. Detected preamble is sent to the Bite Meter for visual indication.
4. It should be noted that preamble is a result of TX CLOCK. TX CLOCK is generated on the 1A1A5 but routed via the 1A1A19 Data Buffer through the INT/EXT switch and back to the 1A1A5. Preamble is TX CLOCK (Selected Data rate) divided by 4.
5. TX CLOCK is generated by 1Mhz from the 1A1A8 Synthesizer and divided down through Data Select Gating Ckts



AN/WSC-3A SATCOM

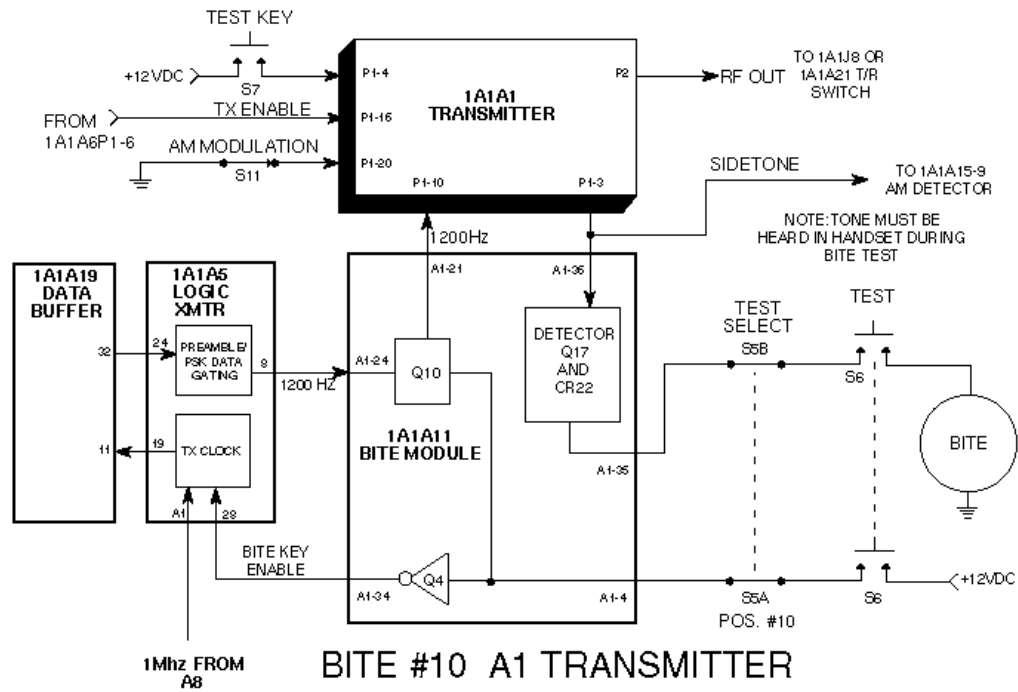
2-13

SATCOM BITE PROCEDURE (cont.)

BITE 10 - TRANSMITTER

1. With Test Select switch in position #10, transmitter forward power can be checked.
 2. With Test Switch 1A1S6 depressed, the Bite meter and +12 Vdc are connected to the Bite circuit 1A1A11. The +12 Vdc is used to enable 4800Hz TX Clock on the 1A1A5 PSK Logic Transmitter Module. This TX Clock signal is sent back to the A5 via 1A1A19 Data Buffer where it is divided by 4 through the Preamble Generator. This 1200Hz clock is then sent to the A11 BITE Module. The 1200hz is then passed to the Transmitter via 1A1A11Q10 at 1A1A1P1-10. If the 1200Hz is not present then bites 16 and 17 will also fail.
 3. When the Test Key 1A1S7 is activated, +12 Vdc is applied to 1A1A1P1-4 and keys the Transmitter.
 - a. Normal RF out is at 1A1A1P2.
 - b. A sampled RF signal is used for the Bite function and sidetone which is sent to the 1A1A15 AM Detector.
 4. At pin 1A1A11A1-36, the sampled RF is sent to the Detector circuit 1A1A11Q17 and CR22. The Detector will generate a DC level that will drive the Bite meter.
 - a. Bite 10 will not work in FM. Make sure receiver is in AM mode.
 - b. 1 Watt is needed to energize the CARRIER ON indicator.
 - c. If the Transmitter overloads or internal PA's are out of ballanced, there will be no power out shown on the Power meter and Bite #10 will fail.
 - d. The Clipper switch 1A1A1A10S2 when ON prevents over-modulation.
 5. Control circuits internal to the 1A1A1 Transmitter module (1A1A1A10) can cause bite 10 to fail.
 - A. VSWR Comparator - J4 (PN 03-04219-001), J3 (all other PN's)
 - B. Overpower protect- J3 (PN 03-04219-001), N/A (all other PN's)
 - C. Over Voltage detect- J1 (PN 03-04219-001), N/A (all other PN's)
 - D. Unbalanced power - J10, J11, J12 (all other PN's) { within 1Vdc of each other }
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SATCOM BITE PROCEDURE (cont.)



Notes:

SATCOM BITE PROCEDURE (cont.)

BITE 11 - Key Command

1. Keying of the AN/WSC-3A (V) can be done in one of three (3) ways on small cutters in Vinson bypass mode. One of two ways on large cutters. There are two handsets and one local key switch.

2. XMIT enters the converter module at 1A1A9P1-7 as a + 5 Vdc level and leaves at pin 1A1A9P1-8 as +12 Vdc when keyed.

*Check 1A1A9A1J4 for +12Vdc when keyed.

3. 1A2J2 pins 48 and 49 on the back of the case are used as a keying interlock. If external equipment is not being used, then these pins must be jumpered to complete the path. On large cutters 210' and up the keyline will go to a terminal board.

4. On 1A1A20, pins P1-26 and P1-27 are hard wired together. If 1A1A20 is out of its slot or the pins are inadvertently pushed in, the radio will not key. When in manual, the Preset Channel Assembly 1A1A20 is bypassed.

5. From 1A1A20P1-26, the keying signal feeds TB1 jacks 11 and 12.

The following circuits are then fed by TB1:

- A. 1A1A21P1-9 - TR Switch -Used to control Transmit/ReceiveRF paths to/from the Antenna system.
- B. 1A1A1A10P1-4 - Transmitter module- Used to key theTransmitter.
- C. 1A1A15P1-12 - AM Detector Module- Used to disable the audio out of the AM Detector.
- D. 1A1A18P1-1 - Front End- Used to disable Front End.
- E. Bite Metering circuit.- Used to show that the keying circuit is working up to TB1. If bite 11 passes then the keyline is good to TB1.

6. Remote PTT when activated will cause a low at the AFC Sweep pin 1A1A12P1-28 via Remote/Local Switch 1A1S3A. At this point, the AFC Sweep will generate a XMIT NOT and XMIT signals and the paths are the same as Local PTT.

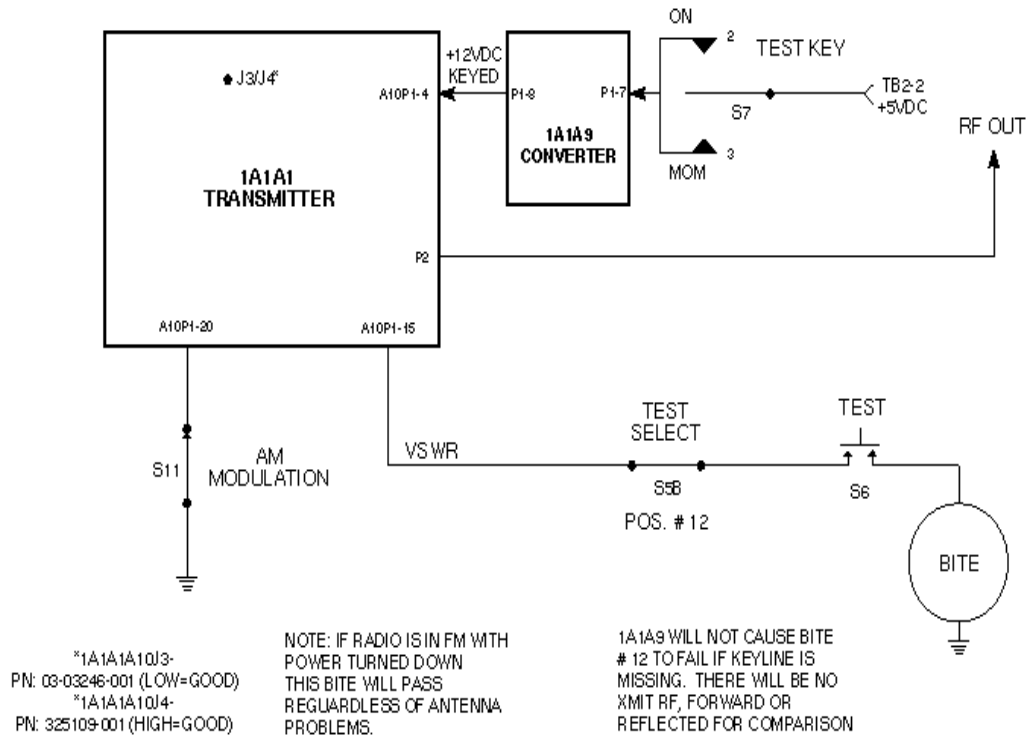
7. Test Keying (momentary or on), when activated, will cause a high to be felt on AFC Sweep pin 1A1A12P1-4. This high is used to generate the XMIT NOTTED within the AFC Sweep and is used for XMIT to the Converter Module 1A1A9. All other functions at this point are the same as the Local PTT.

SATCOM BITE PROCEDURE (cont.)

BITE 12 - VSWR

1. Conditions:
 - a. Mode switch 1A1S11 set to AM modulation
 - b. Test Select Switch 1A1S5 set to pos. #12
 - c. Test Switch 1A1S6 depressed
 - d. Test key 1A1S7 activated.
 2. With Test Key 1A1S7 activated, a +5 Vdc level is applied to the Converter 1A1A9P1-7. The Converter will change this level to +12 Vdc. The +12 Vdc is used to key the Transmitter via 1A1A1A10P1-4. Normal RF output is seen at 1A1A1P2. A Directional Coupler 1A1A1A8 within the Transmitter will develop a DC level that represents the value of reflected power. Within the protect circuitry 1A1A1A10, the reflected power is compared with a preset value. If the reflected power is greater than the preset value, transmission will be inhibited. Transmitted output values of less than 1 watt are not large enough to generate a reflected signal that will be greater than the preset value. Bite #12 will read good even with no antenna connected, if you forget to key the radio. This can happen if you forget to return to local operation. The test key doesn't work in remote.
 3. The Protect circuitry 1A1A1A10 will change a normal VSWR value from the comparator to one that will drive the Bite Meter into the green.
 4. The radio is protected for a VSWR greater than 4:1 (will not key).
 5. To help isolate if the VSWR problem is internal or external to the 1A1A1 Transmitter Module, put the receiver in FM mode, and turn the PWR control fully CCW. Key the transmitter and slowly increase the PWR while watching the carrier indicator. If the carrier indicator lights then the transmitter is good and the fault lies in the T/R Switch if used, the transmission line or the antenna. If the carrier light never lights then the fault probably lies in the transmitter module. An unbalanced power condition in the Transmitter PA's could also give the same indication.
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SATCOM BITE PROCEDURE (cont.)



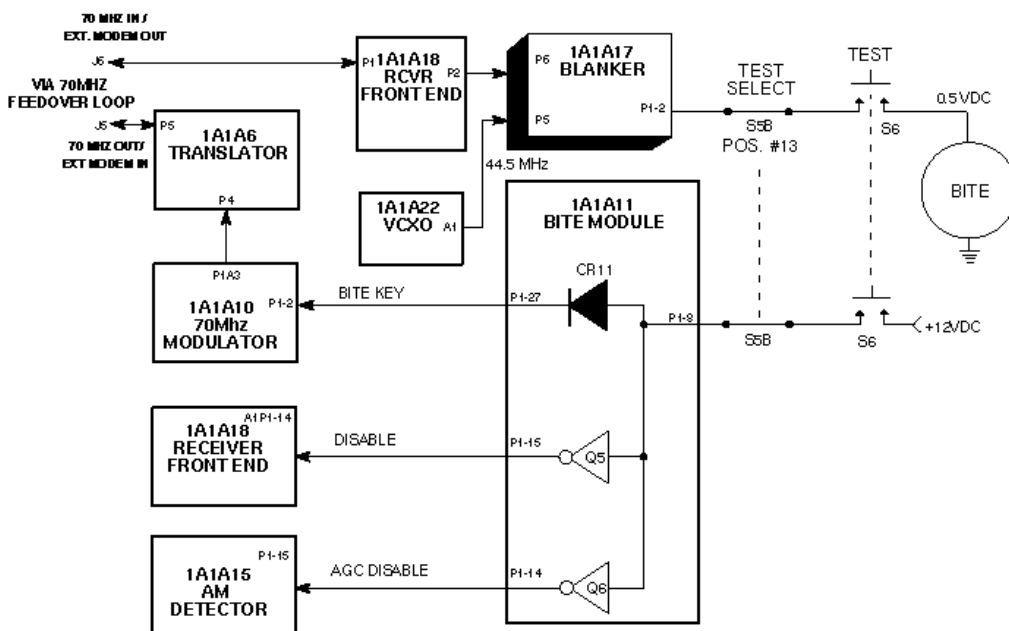
BITE # 12 VSWR

Notes:

SATCOM BITE PROCEDURE (cont.)

BITE 13 - A17 Blanker Module

1. Conditions:
 - a. Test Select Switch 1A1S5 in position #13
 - b. Test Switch 1A1S6 activated.
2. One half of 1A1S6 will connect +12 Vdc to the Bite module 1A1A11P1-
8. The Bite module will then generate three outputs:
 - a. AGC disable to the AM Detector 1A1A15P1-15.
 - b. Receiver Front End disable to 1A1A18A1P1-14.
 - c. BITE key to the Translator 1A1A6P1-10 to generate 70 Mhz.
3. The 70 Mhz from the Translator Bypass is fed through the 70 Mhz Feedover network to the Receiver Front End 1A1A18P1. The receiver front end merely passes it on to the Blanker 1A1A17P6.
4. The Blanker processes the 70 Mhz as a normal received input signal. The 70 Mhz is mixed with the VCXO(44.5 MHz) to produce the 25.5 MHz 2nd IF. This IF signal is amplified and then split between NB and WB. The signal level at the splitter is detected and converted into a DC voltage to drive the Bite meter via 1A1A17P1-2.



BITE # 13 A17 BLANKER

BITE 14 - A16 Main IF

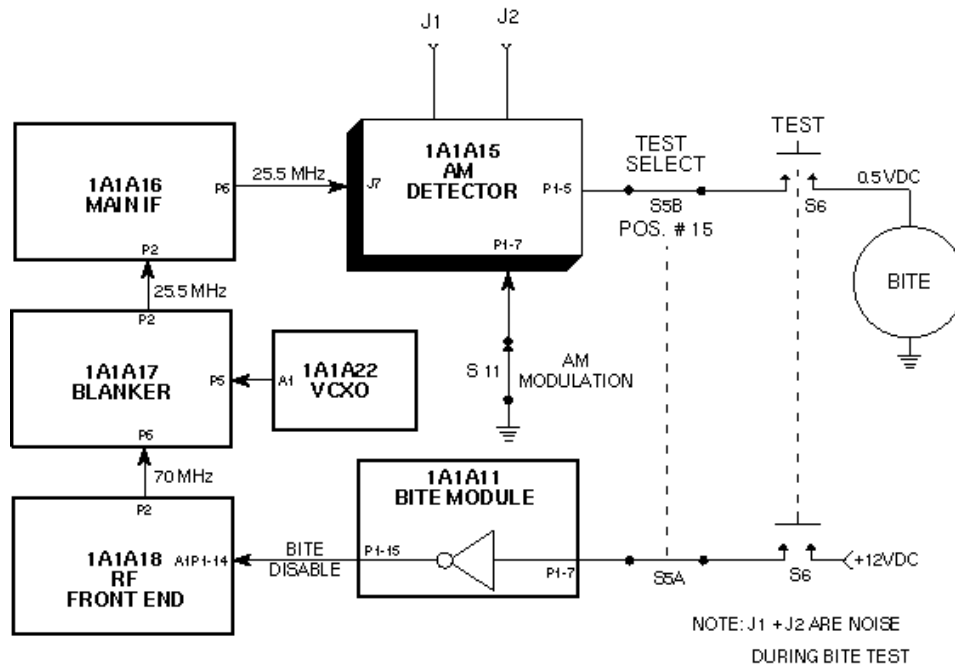
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- The diagram illustrates the signal path and control connections for the 1A1A16 receiver system. The main components and their interconnections are as follows:
- Antenna/Modem Interface:** A 70 MHz IN/EXT. MODEM OUT (J5) is connected to the P1 input of the 1A1A18 RCVR FRONT END. A 70 MHz OUT/EXT. MODEM IN (J5) is connected to the P5 input of the 1A1A6 TRANSLATOR.
 - Signal Processing Chain:**
 - The 1A1A6 TRANSLATOR (P4) outputs to the P1A3 input of the 1A1A10 70Mhz MODULATOR.
 - The 1A1A10 70Mhz MODULATOR (P1-2) outputs to the P1A3 input of the 1A1A18 RECEIVER FRONT END.
 - The 1A1A18 RCVR FRONT END (P2) outputs to the P5 input of the 1A1A17 BLANKER.
 - The 1A1A17 BLANKER (P2) outputs to the P2 input of the 1A1A16 MAIN IF AMP.
 - The 1A1A16 MAIN IF AMP (P2) outputs to the 0.5VDC line, which is connected to the BITE unit.
 - Control and Test Connections:**
 - The 1A1A22 VCXO (A1) provides a reference signal to the P1-27 input of the 1A1A11 BITE MODULE.
 - The 1A1A11 BITE MODULE contains a CR11 diode and two inverters, Q5 and Q6.
 - Q5 (P1-15) outputs to the DISABLE input (A1P1-14) of the 1A1A18 RECEIVER FRONT END.
 - Q6 (P1-14) outputs to the AGC DISABLE input (P1-15) of the 1A1A15 AM DETECTOR.
 - The BITE KEY signal is connected to the P1-27 input of the 1A1A11 BITE MODULE and the P1-2 input of the 1A1A10 70Mhz MODULATOR.
 - TEST SELECT and TEST signals (dashed lines) are connected to POS. #14 and POS. #14 of the BITE unit.
 - The BITE unit is powered by +12VDC (S6) and has a ground connection (S6B).

BITE # 14 A16 MAIN IF AMP

SATCOM BITE PROCEDURE (cont.)

BITE 15 - AM Detector

- Conditions:
 - Squelch Switch 1A1S12 set to disable.
 - Test Select 1A1S5 to position #15.
 - Test Switch 1A1S6 depressed.
- One half of 1A1S6 will apply +12 Vdc to Bite module 1A1A11P1-7 which will generate an AGC Disable signal to the Receiver Front End 1A1A18A1P1-14. This attenuates the 70 MHz 1st IF by 20dB.
- Internal noise of the radio is passed from the 25.5 MHz 2nd IF mixer in the 1A1A17 Blanker. The 2nd IF passes through the 1A1A16 Main IF, and on to 1A1A15 AM Detector as would normal received RF.
- Within the AM Detector a Bite Detector will detect the audio noise and generate a DC level that is representative of the audio noise level which drives the Bite meter.
- Testpoint J1 is the output of the audio amplifier after the Detector. TestPoint J2 is the input to NB audio filter.



BITE # 15 AM DETECTOR

SATCOM BITE PROCEDURE (cont.)

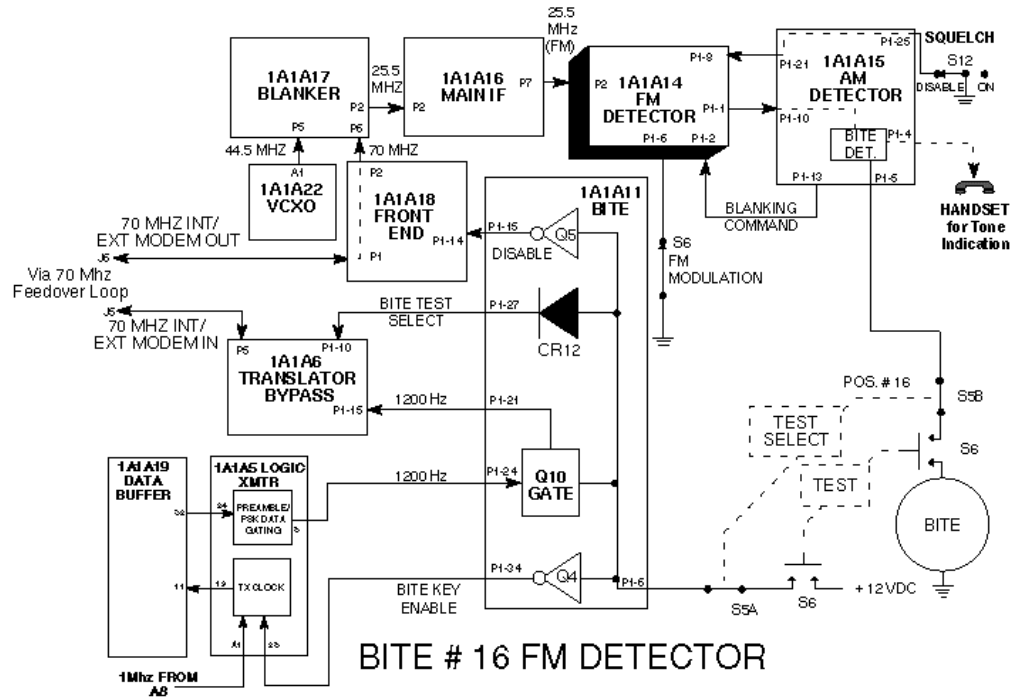
Notes:

SATCOM BITE PROCEDURE (cont.)

BITE 16 - FM Detector

1. Conditions:
 - a. Squelch Switch 1A1S12 disabled.
 - b. Modulation Switch 1A1S11 set to FM.
 - c. Test Select Switch 1A1S5 set to position #16.
 - d. Test Switch 1A1S6 depressed.
 2. One half of 1A1S6 will supply +12 Vdc to the Bite module 1A1A11P1-6. The +12 Vdc will generate the following conditions:
 - a. Bite Preamble Enable to the PSK Logic Transmitter 1A1A5P1-28.
 - b. Activate the 1200 hz gate 1A1A11Q10.
 - c. Oscillator Switch enable to the Modulator 1A1A10P1-2.
 - d. A disable to the Receiver Front End 1A1A18A1P1-14. This prevents received RF from interfering with the Bite test.
 3. With Test Switch 1A1S6 depressed, the Bite meter and +12 Vdc are connected to the Bite circuit 1A1A11. The +12 Vdc is used to enable 4800Hz TX Clock on the 1A1A5 PSK Logic Transmitter Module. This TX Clock signal is sent back to the A5 via 1A1A19 Data Buffer where it is divided by 4 through the Preamble Generator. This resultant 1200Hz clock is then sent to the 1A1A11 BITE Module and passes thru gate 1A1A11Q10 to the Translator to modulate the 70 Mhz.
 4. 70 Mhz passes through the 70 Mhz Feedover network to the 1A1A18 Receiver Front End.
 - a. The 70 Mhz is not processed by the receiver front end. It merely passes through it.
 5. From the point where the signal leaves the Receiver Front End 1A1A18P2 the rest of the modules treat it as though it were normal received RF. The signal passes through 1A1A17 Blanker, 1A1A16 Main IF, 1A1A14 FM Detector, and 1A1A15 AM Detector.
 6. When it arrives at the AM Detector the FM Detector has already demodulated it. The audio is rectified by a Bite circuit within the AM Detector to generate a DC level that will drive the Bite meter. A tone should also be heard in the Handset.
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SATCOM BITE PROCEDURE (cont.)



Notes:

SATCOM BITE PROCEDURE (cont.)

BITE 17 - Receiver Front End

1. Conditions:
 - a. Comm Mode switch 1A1S13 set to LOS.
 - b. Squelch Switch 1A1S12 set to disable.
 - c. Modulation Switch 1A1S11 set to AM.
 - d. Test Select Switch 1A1S5 set to position #17
 - e. Test Switch 1A1S6 activated.
 2. One half of Test Switch 1A1S6 will apply +12 Vdc to Bite module 1A1A11P1Ä5.
 - a. The +12 Vdc will be inverted and used to generate the 1200 Hz as a function of the PSK Logic Transmitter and the TX CLOCK
 - b. The +12 Vdc is also used to turn on the gate circuit to pass the 1200Hz. within the Bite module.
 3. The 1200 hz will leave the PSK Logic Transmitter to be routed by the gate generator to the TR Switch 1A1A21P1-15.
 4. A white noise gate within the TR Switch will generate white noise Amplitude Modulated at an audio rate of 1200 hz.
 5. Noise from the TR Switch 1A1A21J3 is fed into the Receiver Front End 1A1A18A3P1 via 1A1FL1.
 6. The 1A1A18 Receiver Front End, 1A1A17 Blanker, 1A1A16 Main IF, and 1A1A15 AM Detector will process the noise as a received signal.
 7. The AM Detector will demodulate the 1200 hz tone to be used as a received audio signal and also send it to 1A1A11 Bite module .
 8. The Bite module 1A1A11P1-25 will rectify the 1200 hz and generate a DC reference at 1A1A11P1-26 to drive the Bite meter.
 9. A tone should also be heard in the Handset.
-

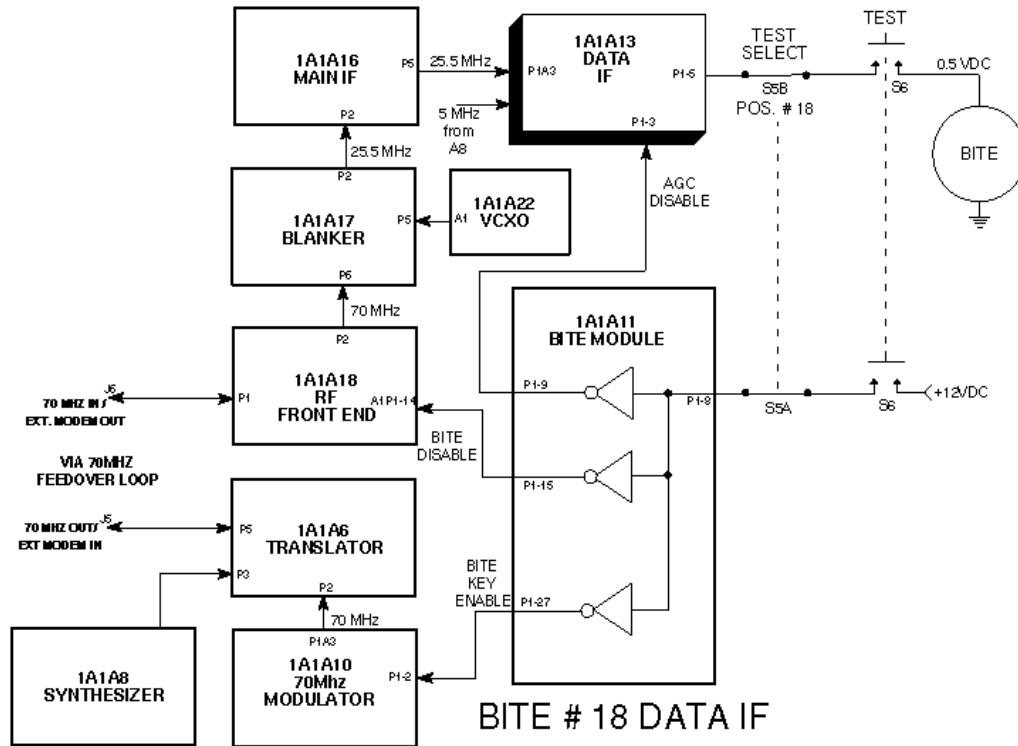


SATCOM BITE PROCEDURE (cont.)

BITE 18 - DATA IF

1. Conditions:
 - a. Comm Mode switch 1A1S13 set to SATCOM.
 - b. Test Select Switch 1A1S5 set to position #18.
 - c. Test Switch 1A1S6 activated.
 2. One half of Test Switch 1A1S6 will apply +12 Vdc to Bite module 1A1A11P1-8.
 - a. The +12 Vdc will be inverted and used to generate the BITE KEY enable to generate 70Mhz from the 70Mhz Modulator.
 - b. The +12 Vdc will be inverted and used to generate the BITE DISABLE in the Receiver Front End to isolate RX signals coming in.
 - c. The +12 Vdc will be inverted and used to generate the AGC BITE DISABLE in the Data IF.
 3. 70Mhz is generated in the 1A1A10 and passed to the 1A1A6 Translator. The Translator will then pass the 70Mhz over the Feedover loop into the Receiver Front End. The Receiver Front End amplifies and then sends the 70Mhz to the Blanker 1A1A17. The Blanker mixes 44.5Mhz from the 1A1A22 VCXO to form the 2nd IF 25.5Mhz. This second IF is then Amplified and routed to the 1A1A16 Main IF Amplifier.
 4. The 1A1A16 Main IF Amplifier also amplifies the 25.5Mhz and routes this second IF to the Data IF 1A1A13. The Data IF takes the 5Mhz reference from the Synthesizer 1A1A8 and multiplies by 5 times to produce a 25Mhz LO signal. This LO mixes with the 25.5Mhz to produce the 500Khz 3rd IF.
 5. Bite 18 detects this 500Khz signal after it is amplified. The resultant DC Voltage is then sent to the Bite Meter. It should be noted that AGC is interactive with this module and affects normal operation of this Module.
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SATCOM BITE PROCEDURE (cont.)

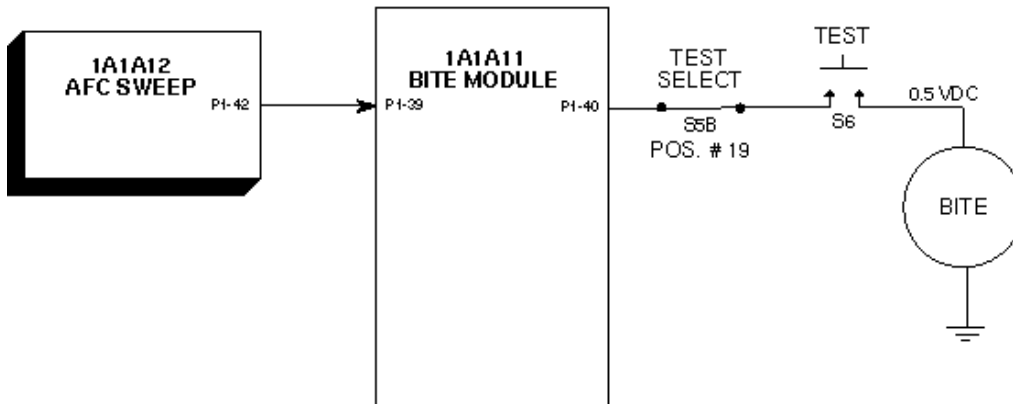


NOTES:

SATCOM BITE PROCEDURE (cont.)

BITE 19 - AFC Sweep

1. Conditions:
 - a. Comm Mode Switch 1A1S13 to SATCOM.
 - b. Test Select 1A1S5 to position #19.
 - c. Test Switch 1A1S6 Activated.
 2. One half Test Switch will connect the sweep signal to the Bite Meter via the 1A1A11 Bite Module.
 3. The Sweep voltage is a ramp voltage between -2Vdc and -4Vdc. This voltage is what drives the VCXO 1A1A22 to provide 44.5Mhz. As the voltage changes the frequency changes. This is to compensate for the Transmitting and Receiving Radio frequency discrepancies.
-



BITE # 19 A12 AFC Sweep

SATCOM BITE PROCEDURE (cont.)

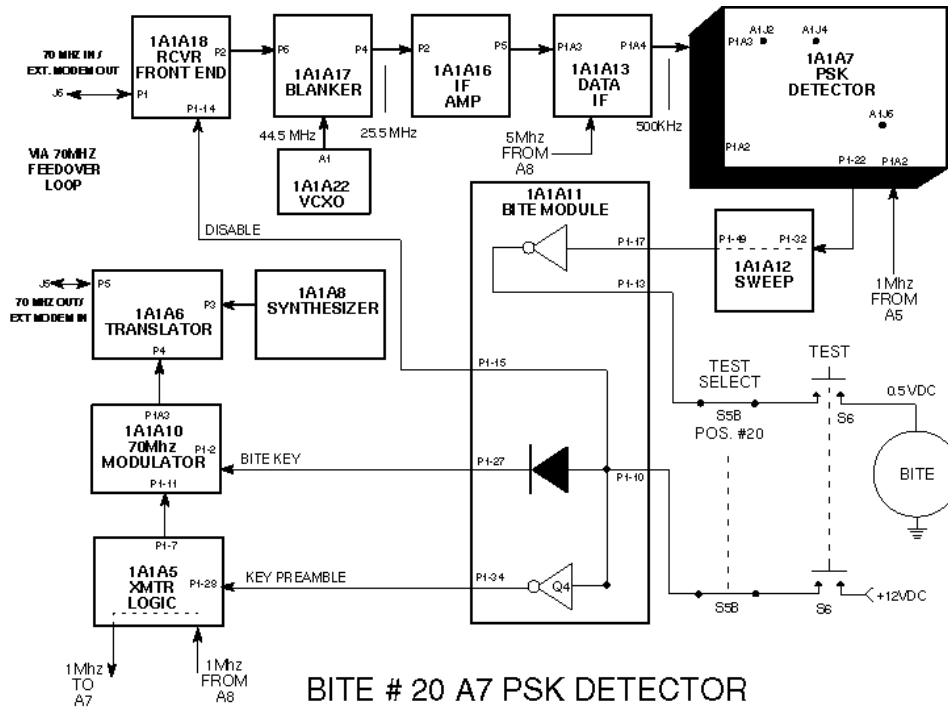
NOTES:

SATCOM BITE PROCEDURE (cont.)

Bite 20 - PSK Detector

1. Conditions:
 - a. Comm Mode Switch 1A1S13 to SATCOM.
 - b. Test Select 1A1S5 to position #20.
 - c. Selected PSK Data Rate
 - d. Test Switch 1A1S6 Activated.
 2. +12Vdc is applied to 1A1A11P1-10 and:
 - a. Inverted to a low to generate Key Preamble 1A1A11P1-34 to 1A1A5P1-28 to generate preamble on the 1A1A5.
 - b. Generates Front End Disable from 1A1A11P1-15 to 1A1A5P1-14 to isolate any Received RF.
 - c. Generates Key Modulator from 1A1A11P1-27 to 1A1A10P1-2 and 1A1A6P1-10 to create 70Mhz and pass it over the Feedover Loop.
 - d. Inverts to a low to generate Bite Enable from 1A1A11P1-20 to 1A1A10P1-16.
 - e. Generates Bite Data from 1A1A11P129 to 1A1A10P1-6
 3. The Bite test generates Test Data in the 1A1A5 and sends it to the 1A1A10 where it modulates the 70Mhz 1st IF. This IF is then sent out through the Feedover Loop where it is passed through the 1A1A18 Receiver Front End to the 1A1A17 Blanker. The Blanker and the 1A1A22 VCXO mix with the Receive IF to create 25.5Mhz 2nd IF. This 2nd IF is then routed to the 1A1A16 IF Amplifier which amplifies and routes the IF signal to the 1A1A13 Data IF. The Data IF takes 5Mhz from the 1A1A23 and multiplies it times 5 to produce the 3rd LO of 25Mhz. This 25Mhz LO and 25.5Mhz 2nd IF mix on the 1A1A13 Data IF to form the 500Khz 3rd IF. This 500Khz Data IF is sent to the PSK Detector to demodulate the encoded data from the IF.
 4. The Carrier Acquired signal from 1A1A12P1-32 is what drives the Bite Meter. This signal is a result of good received data detected in the 1A1A7 PSK Detector.
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SATCOM BITE PROCEDURE (cont.)

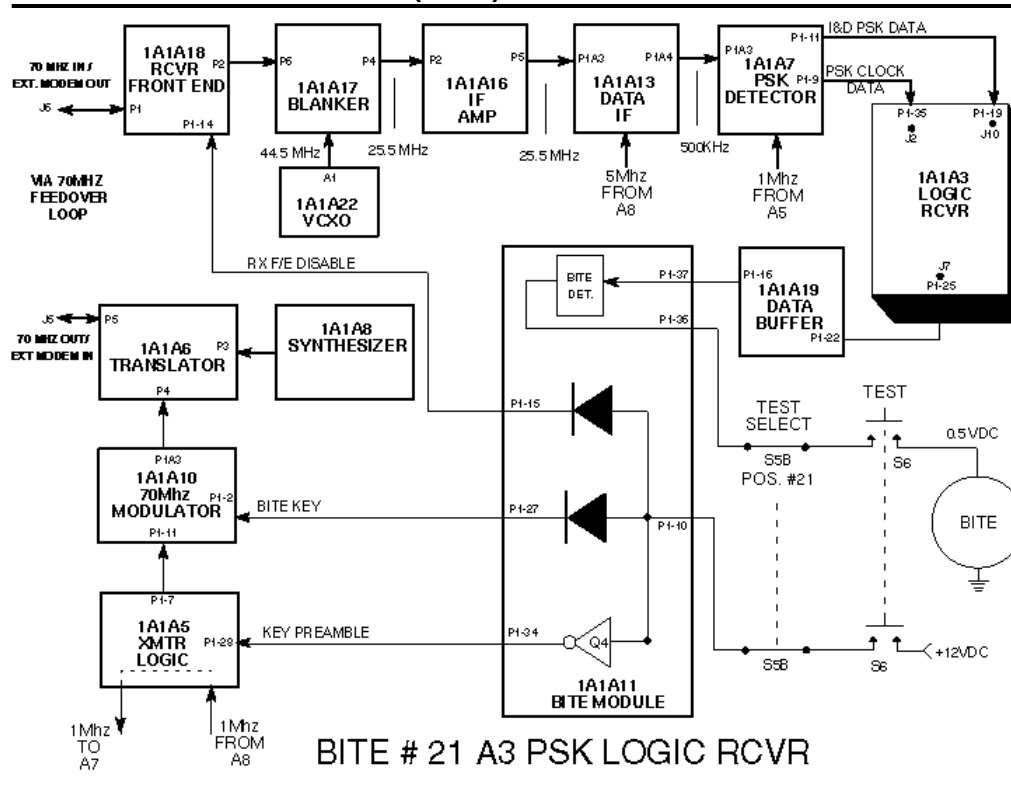


NOTES:

SATCOM BITE PROCEDURE (cont.)

Bite 21 - PSK Logic Receiver

1. Conditions:
 - a. Comm Mode Switch 1A1S13 to SATCOM.
 - b. Test Select 1A1S5 to position #21.
 - c. Selected PSK Data Rate
 - d. Test Switch 1A1S6 Activated.
 2. +12Vdc is applied to 1A1A11P1-10 and:
 - a. Inverted to a low to generate Key Preamble 1A1A11P1-34 to 1A1A5P1-28 to generate preamble on the 1A1A5.
 - b. Generates Front End Disable from 1A1A11P1-15 to 1A1A5P1-14 to isolate any Received RF.
 - c. Generates Key Modulator from 1A1A11P1-27 to 1A1A10P1-2 and 1A1A6P1-10 to create 70Mhz and pass it over the Feedover Loop.
 - d. Inverts to a low to generate Bite Enable from 1A1A11P1-20 to 1A1A10P1-16.
 - e. Generates Bite Data from 1A1A11P129 to 1A1A10P1-6
 3. The Bite test generates Test Data in the 1A1A5 and sends it to the 1A1A10 where it modulates the 70Mhz 1st IF. This IF is then sent out through the Feedover Loop where it is passed through the 1A1A18 Receiver Front End to the 1A1A17 Blanker. The Blanker and the 1A1A22 VCXO mix with the Receive IF to create 25.5Mhz 2nd IF. This 2nd IF is then routed to the 1A1A16 IF Amplifier which amplifies and routes the IF signal to the 1A1A13 Data IF. The Data IF takes 5Mhz from the 1A1A23 and multiplies it times 5 to produce the 3rd LO of 25Mhz. This 25Mhz LO and 25.5Mhz 2nd IF mix on the 1A1A13 Data IF to form the 500Khz 3rd IF. This 500Khz Data IF is sent to the PSK Detector to demodulate the encoded data from the IF. The PSK Clock Data and the I&D PSK Data signals are extracted from the encoded data and then sent to the 1A1A3 PSK Logic Receiver.
 4. The 1A1A3 PSK Logic Receiver routes the original data to the 1A1A19 Data Buffer. The Data Buffer sends sampled Data to the 1A1A11 Bite Module detector circuits. The resulting DC voltage is what drives the Bite Meter.
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NOTES:

SATCOM BITE PROCEDURE (cont.)

Bite 22 - PSK Logic Receiver

1. Conditions:
 - a. Comm Mode Switch 1A1S13 to SATCOM.
 - b. Test Select 1A1S5 to position #22.
 - c. Modulation Switch to FSK
 - d. Test Switch 1A1S6 Activated.
 2. +12Vdc is applied to 1A1A11P1-10 and:
 - a. Inverted to a low to generate Key Preamble 1A1A11P1-34 to 1A1A5P1-28 to generate preamble on the 1A1A5.
 - b. Generates Front End Disable from 1A1A11P1-15 to 1A1A5P1-14 to isolate any Received RF.
 - c. Generates Key Modulator from 1A1A11P1-27 to 1A1A10P1-2 and 1A1A6P1-10 to create 70Mhz and pass it over the Feedover Loop.
 - d. Inverts to a low to generate Bite Enable from 1A1A11P1-20 to 1A1A10P1-16.
 - e. Generates Bite Data from 1A1A11P129 to 1A1A10P1-6
 3. The Bite test generates Test Data in the 1A1A5 and sends it to the 1A1A10 where it modulates the 70Mhz 1st IF. This IF is then sent out through the Feedover Loop where it is passed through the 1A1A18 Receiver Front End to the 1A1A17 Blanker. The Blanker and the 1A1A22 VCXO mix with the Receive IF to create 25.5Mhz 2nd IF. This 2nd IF is then routed to the 1A1A16 IF Amplifier which amplifies and routes the IF signal to the 1A1A13 Data IF. The Data IF takes 5Mhz from the 1A1A23 and multiplies it times 5 to produce the 3rd LO of 25Mhz. This 25Mhz LO and 25.5Mhz 2nd IF mix on the 1A1A13 Data IF to form the 500Khz 3rd IF. This 500Khz Data IF is sent to the 1A1A4 FSK Detector. The FSK Detector recovers the original Data.
 4. The 1A1A4 FSK Logic Receiver routes the original data to the 1A1A19 Data Buffer. The Data Buffer sends sampled Data to the 1A1A11 Bite Module detector circuits. The resulting DC voltage is what drives the Bite Meter.
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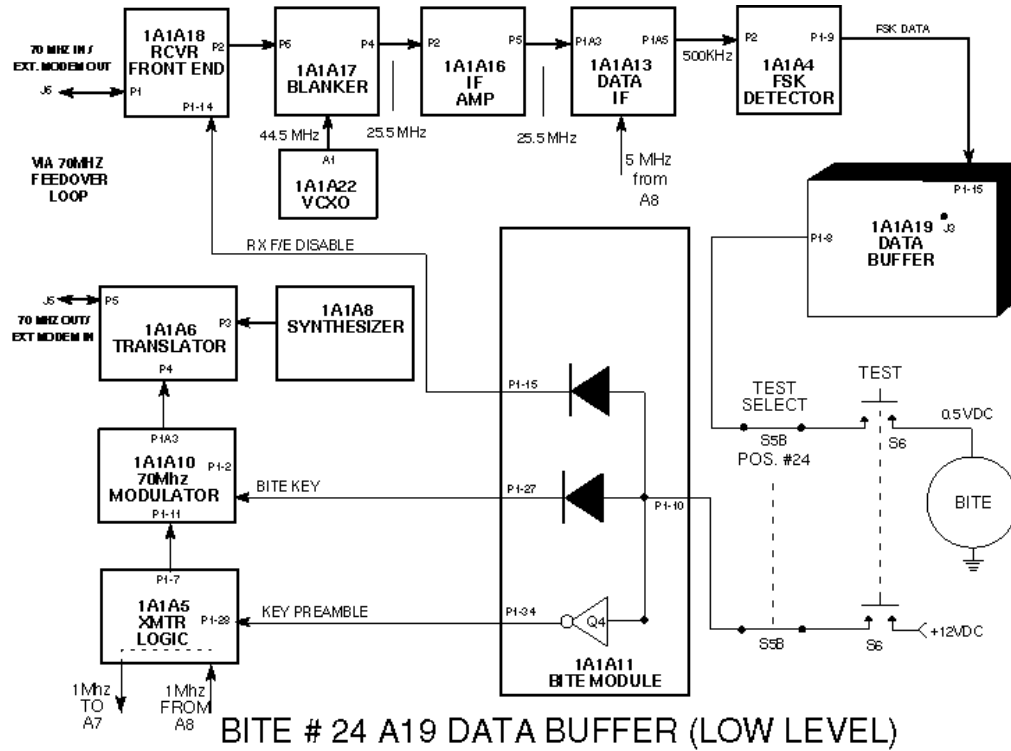
[illegible]

SATCOM BITE PROCEDURE (cont.)

Bite 24 - Data Buffer (Low Level)

1. Conditions:
 - a. Comm Mode Switch 1A1S13 to SATCOM.
 - b. Test Select 1A1S5 to position #24.
 - c. Modulation Switch to FSK
 - d. Test Switch 1A1S6 Activated.
 2. +12Vdc is applied to 1A1A11P1-10 and:
 - a. Inverted to a low to generate Key Preamble 1A1A11P1-34 to 1A1A5P1-28 to generate preamble on the 1A1A5.
 - b. Generates Front End Disable from 1A1A11P1-15 to 1A1A5P1-14 to isolate any Received RF.
 - c. Generates Key Modulator from 1A1A11P1-27 to 1A1A10P1-2 and 1A1A6P1-10 to create 70Mhz and pass it over the Feedover Loop.
 - d. Inverts to a low to generate Bite Enable from 1A1A11P1-20 to 1A1A10P1-16.
 - e. Generates Bite Data from 1A1A11P129 to 1A1A10P1-6
 3. The Bite test generates Test Data in the 1A1A5 and sends it to the 1A1A10 where it modulates the 70Mhz 1st IF. This IF is then sent out through the Feedover Loop where it is passed through the 1A1A18 Receiver Front End to the 1A1A17 Blanker. The Blanker and the 1A1A22 VCXO mix with the Receive IF to create 25.5Mhz 2nd IF. This 2nd IF is then routed to the 1A1A16 IF Amplifier which amplifies and routes the IF signal to the 1A1A13 Data IF. The Data IF takes 5Mhz from the 1A1A23 and multiplies it times 5 to produce the 3rd LO of 25Mhz. This 25Mhz LO and 25.5Mhz 2nd IF mix on the 1A1A13 Data IF to form the 500Khz 3rd IF. This 500Khz Data IF is sent to the 1A1A4 FSK Detector. The FSK Detector recovers the original data from the 500Khz IF and then sends the data to the 1A1A19 Data Buffer where it is routed off to either High Level or Low Level data paths to Base Band Equipment.
 4. The Data is detected on the 1A1A19 Data buffer and the resulting DC voltage is sent to the Bite Meter for visual indication.
 5. The Coast Guard only uses Low Level data paths to Base Band equipment. The Coast Guard also doesn't use the FSK mode of Data as it is only 75 Baud.
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SATCOM BITE PROCEDURE (cont.)



1A1A9 Converter BCD codes

Notes:

Tuning Voltages

Operating Frequency vs. Tuning Voltage

- * Set FREQ SELECT switch to MAN
- * Select the listed frequencies manually
- * COMM MODE switch must be set to LOS to read the voltages or the radio must be keyed if in the SATCOM position

<u>FREQUENCY(Mhz)</u>	<u>1A1A18A1-J1(Vdc)</u>	<u>1A1A18A1-J3(Vdc)</u>
225	1.38 +/- 0.04	1.39 +/- 0.07
230	1.61 +/- 0.04	1.68 +/- 0.07
240	2.12 +/- 0.04	2.23 +/- 0.07
250	2.78 +/- 0.04	2.81 +/- 0.10
260	3.48 +/- 0.08	3.43 +/- 0.12
270	4.28 +/- 0.08	4.28 +/- 0.17
280	5.24 +/- 0.12	5.24 +/- 0.20
290	6.36 +/- 0.12	6.71 +/- 0.20
299	7.48 +/- 0.12	-
300	7.56 +/- 0.15	7.91 +/- 0.20
310	9.045 +/- 0.30	9.17 +/- 0.27
320	10.66 +/- 0.30	10.97 +/- 0.30
330	12.55 +/- 0.30	13.11 +/- 0.30
340	14.68 +/- 0.40	15.20 +/- 0.40
350	17.01 +/- 0.60	17.32 +/- 0.42
360	19.71 +/- 0.60	19.90 +/- 0.45
370	22.81 +/- 0.60	23.97 +/- 0.47
380	26.32 +/- 0.60	27.60 +/- 0.50
390	30.24 +/- 0.60	31.50 +/- 0.50
399	34.29 +/- 0.60	35.06 +/- 0.50
